



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/058,586 | 01/26/2002 | Saeed Asgari | Q01-1006 US1 | 4114 |
| 32093 | 7590 | 06/09/2004 | EXAMINER | |
| HANSRA PATENT SERVICES 4525 GLEN MEADOWS PLACE BELLINGHAM, WA 98226 | | | DAVIDSON, DAN | |
| | | ART UNIT | PAPER NUMBER | |
| | | 2651 | | |
| DATE MAILED: 06/09/2004 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

5

| | | |
|------------------------------|----------------------------|---------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/058,586 | ASGARI ET AL. |
| | Examiner Dan I Davidson | Art Unit 2651 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 26 January 2002.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) See Continuation Sheet is/are rejected.
- 7) Claim(s) 5,7,10-12,16,22,26,27,31,35,37,41,44-47,50,59,61 and 66 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>4</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ . |

Continuation of Disposition of Claims: Claims rejected are 1-4,6,8,9,13-15,17-21,23-25,28-30,32-34,36,38-40,42,43,48,49,51-58,60,62-65 and 67.

DETAILED ACTION

1. The information disclosure statement filed December 8, 2003 has been received and has been considered and made of record.

Claim Objections

2. Claims 28-29 are objected to since they do not clearly delineate the subject matter present in the claims. The Examiner interprets claim 28 to state that corresponding zones on different storage media surfaces are looked at when assigning frequencies to different heads. The Examiner interprets claim 29 to state that zones on the same storage media surface are looked at when assigning frequencies to the same head (i.e. for when head operates well at inner diameter and poorly at outer diameter of storage media surface and vice versa).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 25 and 58 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner does not understand the limitation at these claims.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 62-65 and 67 are rejected under 35 U.S.C. 102(b) as being anticipated by Hetzler et al (US 6,137,644 A).

Re claim 62; Hetzler et al disclose a data storage device comprising a plurality of pairs of storage media surfaces and transducer heads, each transducer head for recording on and playback of information from a corresponding storage medium in multiple zones (Fig. 4; col. 6, lines 60-65), and a controller that controls the heads for reading and writing data on the media surfaces, the controller being programmed to write data in the multiple zones (inherent; must be present), wherein: the multiple zones on each storage media are arranged as concentric zones, each zone having an inner and an outer boundary (Fig. 4, 42), such that each storage media includes the same number of concentric zones as other storage media in the data storage device, wherein the boundaries of radially similarly situated zones on all the storage media in that data storage device are at the same radial location (col. 9, lines 6-18; similarly situated zone boundaries can be at the same radial location when track pitch or number of ECC bytes varied).

Re claim 63; Hetzler et al disclose that the radially similarly situated zones on all the storage media include the same number of concentric tracks (true if ECC bytes varied).

Re claim 64; Hetzler et al disclose that at least a number of radially similarly situated zones on all the storage media include different number of concentric tracks (true if track pitch varied).

Art Unit: 2651

Re claim 65; Hetzler et al disclose that each storage media includes a sequence of concentric zones, such that the boundaries of at least a number of sequentially similarly situated zones on different storage media in that data storage device are at different radial locations (see Fig. 4).

Re claim 67; since the zone boundary locations are varied, the track pitch is constant, and thus there are a different number of concentric tracks in at least a number of sequentially similarly situated zones on all the storage media.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-4, 6, 8-9, 13-15, 17-21, 23-24, 28-30, 32-34, 36, 38-40, 42-43, 48-49, 51-57, and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al (US 6,182,250 B1).

Re claims 1, 39, and 42; Ng et al disclose a method of defining a storage format in a data storage device (col. 3, lines 16-18; "surface recording density") having a plurality of storage media and a plurality of corresponding data transducer heads (col. 2, line 66 – col. 3, line 2), each transducer head for recording on and playback of information from a corresponding storage medium (col. 3, lines 2-6) in multiple zones (col. 3, lines 27-28), the method comprising the steps of: (a) (1) measuring a performance of each head in a data storage device at one or more read/write

frequencies (col. 5, lines 37-46) per zone (col. 10, lines 6-7), and (2) based on the performance measurements, jointly: selecting a group of read/write frequencies, two or more read/write frequencies for each zone, and allocating one or more of the heads in the data storage device to each frequency in the group of frequencies per zone (col. 5, line 50 – col. 6, line 9); and (b) in the storage device, assigning one of the frequencies to each head per zone, based on capability of that head (col. 6, lines 16-33; “head map table”; col. 10, lines 9-10; “many logical heads for each physical head”).

Ng et al do not disclose multiple data storage devices. There is no patentable distinction between defining a storage format for a single data storage device and defining a storage format for multiple unrelated data storage devices (this is because the process is the same, just done multiple times). It would have been obvious to one of ordinary skill in the art at the time of Applicants’ invention to define a storage format for multiple data storage devices; motivation being increased production.

Re claims 2-3 and 40; Ng et al disclose that measuring a performance of each head further includes measuring a record/playback performance of that head at different frequencies at multiple storage medium locations (col. 5, lines 37-46).

Re claim 4; Ng et al disclose that measuring a performance of each head further includes measuring a record/playback performance of that head according to a performance metric at different frequencies (see col. 5, lines 27-32 and col. 5, lines 37-46).

Re claim 6; defining steps (a) and (b) as two different processes without further clarification is not a patentably distinct limitation.

Re claims 8 and 32; the limitation at these claims is satisfied based on the discussion above with respect to claim 1. The Examiner does not view this claim limitation as further limiting the claim limitation at claim 1.

Re claims 9, 13, and 43; Ng et al disclose jointly selecting the frequencies and allocating the heads to the frequencies to satisfy a specified constraint comprising providing a required data storage capacity for the data storage device (col. 5, line 62 – col. 6, line 5).

Re claims 14 and 48; Ng et al disclose providing a required data storage device yield for the data storage device (col. 5, line 62 – col. 6, line 1; all heads are able to be used).

Re claims 15 and 30; these claims are satisfied based upon the passages in Ng et al cited above.

Re claims 17 and 51; many of the limitations at this claim are satisfied by Ng et al based on the discussion of claim 1 above. Ng et al further disclose that based on performance measurements, performance distributions of the heads in a data storage device is generated for a target performance metric (col. 5, lines 50-58) at each zone (col. 10, lines 6-7).

Re claims 18 and 52; Ng et al disclose that generating the distributions further includes the steps of: estimating record/playback frequency capability of each head based on the measurements (col. 5, lines 50-58); and generating record/playback frequency capability distributions of the heads at each zone for a target performance

metric based on the estimated record/playback frequency capabilities of the heads (col. 5, line 58 – col. 6, line 9).

Re claims 19 and 53; Ng et al disclose that generating the distributions is performed in a post-processing phase (col. 5, lines 44-49).

Re claims 20 and 54; Ng et al disclose that generating the distributions includes the steps of: generating record/playback frequency capability distributions of the heads based on the performance measurements at a target performance metric for the heads in the data storage device (again, col. 5, line 50 – col. 6, line 9).

Re claims 21 and 55; Ng et al disclose that selecting the group of frequencies further includes the steps of selecting the group of frequencies to satisfy a specified constraint (col. 6, lines 4-5).

Re claims 23 and 56; Ng et al disclose the claim limitations in this claim based on the sections of Ng et al cited above.

Re claims 24 and 57; Ng et al disclose obtaining record/playback performance of each head at a performance metric per zone at one of the read/write frequencies (col. 5, lines 41-44); for each zone, ranking the heads from best to worst according to the performance metric (col. 5, lines 50-51; col. 10, lines 6-7); and assigning the allocated number of heads, according to the ranking, to one of the read/write frequencies (col. 6, lines 16-33).

Re claim 28; Ng et al disclose that corresponding zones on different storage media surfaces are looked at when assigning frequencies to different heads (col. 5, lines 39-40).

Re claim 29; Ng et al disclose that zones on the same storage media surface are looked at when assigning frequencies to the same head (col. 10, lines 6-7).

Re claims 33 and 34; most of the claim limitations at this claim are satisfied based on that discussed above with respect to claim 1. Ng et al further disclose that the multiple zones are concentric zones with an inner and outer boundary, and that each storage medium in a data storage device has the same number of concentric zones and that the boundaries of radially similarly situated zones of all the storage media in the data storage device are at the same radial locations (col. 3, lines 28-38). Since there is no teaching of variable track density in Ng et al, the limitation at claim 34 is met.

Re claims 36 and 38; Ng et al disclose having multiple zones on each storage media with inner and outer boundaries of sequentially similarly situated zones at different radial locations (col. 10, lines 32-35). Since there is no teaching of variable track density in Ng et al, the limitation at claim 38 is met.

Re claims 49 and 60; Ng et al disclose that the constraint comprises maximizing the data storage device yield while providing a specified data storage capacity of the storage device (col. 6, lines 4-5).

Allowable Subject Matter

9. Claims 5, 7, 10-12, 16, 22, 26-27, 31, 35, 37, 41, 44-47, 50, 59, and 61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Re claims 5 and 22; the prior art of record, and in particular Ng et al (US 6,182,250 B1), fails to teach or suggest that the performance metric includes symbol error rate off track, mean squared error on track, and mean squared error off track.

Re claims 7 and 41; the prior art of record, and in particular Ng et al (US 6,182,250 B1), fails to teach or suggest that the format design process (step (a)) is part of storage device design phase and the test process (step (b)) is part of storage device manufacturing phase.

Re claims 10, 27, 44, and 59; the prior art of record, and in particular Ng et al (US 6,182,250 B1), fails to teach or suggest measuring performance of each head at different frequencies per zone based on a performance metric.

Re claims 16, 31, 50, and 61; the prior art of record, and in particular Ng et al (US 6,182,250 B1), fails to teach or suggest that the constraint comprises maximizing the data storage capacity for the data storage device while providing a specified data storage device yield.

Re claim 26; the prior art of record, and in particular Ng et al (US 6,182,250 B1), fails to teach or suggest that steps (i) – (iii) in claim 24 are repeated for each of the frequencies, starting from the highest frequency to the lowest frequency.

Re claim 35; the prior art of record, and in particular Ng et al (US 6,182,250 B1), fails to teach or suggest at least a number of radially similarly situated zones on all the storage media including different number of concentric tracks (in view of claim 33).

Re claim 37; the prior art of record, and in particular Ng et al (US 6,182,250 B1), fails to teach or suggest sequentially similarly situated zones on all the storage media including the same number of concentric tracks (in view of claim 36).

Re claim 66; the prior art of record, and in particular Hetzler et al (US 6,137,644 A), fails to teach or suggest that sequentially similarly situated zones on all the storage media include the same number of concentric tracks (in view of claim 65).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan I Davidson whose telephone number is (703) 308-8535. The examiner can normally be reached on Monday-Friday from 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R Hudspeth, can be reached on (703) 308-4825. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Art Unit: 2651

DID

Dan I Davidson
June 4, 2004



DAVID HUDSPETH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600